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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/854,779	05/14/2001	Hans Kragl	Prinz 109	8165

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EXAMINER

NORRIS, JEREMY C

ART UNIT

PAPER NUMBER

2827

DATE MAILED: 07/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/854,779	KRAL ET AL.	
	Examiner	Art Unit	
	Jeremy C. Norris	2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 09 May 2003.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 7-10, 12-14, 16-19 and 22-31 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-6, 11, 20 and 21 is/are rejected.
- 7) Claim(s) 15 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on 24 May 2002 is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) Interview Summary (PTO-413) Paper No(s). _____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____.

DETAILED ACTION

Election/Restrictions

Examiner has considered Applicants' arguments and, in light of the amendment to claim 11 to cause it to depend from claim 1, claim 11 is deemed to be parcel of the elected embodiment.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-6, 11, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,007,669 (hereafter Crumly '669) in view of US 5,207,887 (hereafter Crumly '887) and US 6,434,819 (hereafter Rokugawa).

Examiner notes that Crumly '887 is incorporated by reference into Crumly '669 (see Crumly '669, col. 2, lines 55-65). Hence, Crumly '669 contains all of the teachings of Crumly '887. Examiner has merely cited Crumly '887 *explicitly* to aid in illustration.

Crumly '669 discloses, referring to figures 1 and 2, a circuit board, consisting of at least two individual circuit board layers (6, 8) made of plastics (see col. 2, lines 5-15) and produced by a formation technique, which each have first and second functional sides and at least one microstructured positioning formation (14, 20), said at least one formation being comprised of at least one projection (14) and at least one recess (20) positioned in interconnecting engagement, said at least one projection being formed on at least one of the first and second functional sides of one of said at least two individual circuit board layers, said at least one recess being formed on at least one of the first and second sides of another of said at least two individual circuit board layers and positioned in interconnecting engagement with said at least one projection, said positioning formation being formed integrally (see Crumly '667, col. 2, lines 55-65 and Crumly '887, figures 1-9) during formation of said circuit board layers, and a metalization (21) on one of the functional sides. Crumly '669 does not specifically disclose locating the metalization in a trench [claim 1]. However, it is well known in the art to embed conductors within a trench in multilayered PCBs to reduce the overall thickness of the device, as evidenced by Rokugawa (see conductor 15a in figure 2(e)). Therefore, it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to embed the metalization of the invention of Crumly '669, as known in the art and demonstrated by Rokugawa. The motivation for doing so

would have been to reduce the overall size of the device and thus making it adaptable to applications with tighter space constraints.

Moreover, the modified invention of Crumly '669 discloses that the positioning formation is a protrusion [claim 2], wherein each individual layer is provided with a plurality of protrusions (14) on one side and a plurality of depressions (20) on the other, the protrusions of the one individual layer engaging into the depressions of the other individual layer, so that the two individual layers are precisely positioned in relation to each other [claim 6], characterized in that the conductor trench is rectangular in cross-section (see Crumly '887, figure 9) wherein the two individual layers are connected with each other by an electrically conductive material (see col. 2, lines 1-10) [claim 20], wherein a contact opening (20) is provided in at least one of the individual layers, the contact opening extending for the first side through the layer to the second side thereof, and that the opening is filled with an electrically conductive material (see figure 2) [claim 21].

Additionally, although the modified invention of Crumly '669 does not specifically state that the feature is in the shape of a pyramid, Crumly '669 does indeed state that the shape may vary (see col. 2, lines 50-60). It would have been an obvious matter to one of ordinary skill in the art to form the feature in a pyramid shape [claim 3]. Moreover, it has been held that more than a mere change of form is necessary for patentability. *Span-Deck, Inc v. Fab-Con, Inc.* (CA 8, 1982) 215 USPQ 835. Furthermore, it is clear that the modified invention of Crumly '669 discloses the position

feature to be a depression (20) [claim 4], complementary to any shaped protrusion (see col. 2, lines 15-25), including a pyramid-shaped protrusion [claim 5].

Response to Arguments

Applicant's arguments filed 9 May 2003 have been fully considered but they are not persuasive.

First, Applicants argue at length that the raised features of Crumly '669 "do not serve any positioning function". However, Examiner notes that Crumly '669 *clearly* states "The multiple layers are stacked with the raised features from one layer aligning with pads of an overlying or underlying layer" (see col. 1, lines 35-40). One of ordinary skill in the art would understand that the raised features are indeed serving a "positioning function".

Next, Applicants contend "the positioning of the dielectric layers with respect to each other is achieved by some other means based on the assembly steps shown in Figs. 3 and 4". However, Examiner notes that figs. 3 & 4 do not even address joining circuit layers, but are rather an alternate embodiment of the invention of Crumly '669, joining a chip carrier to a substrate, not separate substrate layers. Assuming, *en arguendo*, that Applicants' assessment is correct, it is still moot as the figures show an embodiment alternate to that which Examiner has relied upon for rejection of the instantly claimed invention. Examiner submits that figures 1 and 2 are properly representative of the positioning function served by the raised features.

Additionally, Applicants' allege that the presence of intermediate layer 16 prevents the raised features from providing for "a positioning in interconnecting

engagement with the contact pads (34) without some other means being used to precisely position the layers with respect to one another. Again, Examiner submits that Applicants are addressing an alternate embodiment. However, the embodiment of figures 1 & 2 also contains an adhesive layer 16, yet, as obvious to one of ordinary skill in the art, it presents no obstacle to the positioning function of the raised features (see Crumly '669, col. 2, lines 15-25).

Furthermore, Applicants submit that the "raised features (14) are applied separately after formation of the circuit board layer". Applicants continue by repeating a list of processes discloses in Crumly '669, to show that all the formation processes necessarily require "separate finishing operations for the individual layers". However, Applicants' neglected to study the "mandrel process" of Crumly '887, disclosed in Crumly '669. As discussed in detail in Crumly '887, this process indeed forms the raised feature (24) integral with the formation of the circuit layers (18, 20).

Next, Applicants traverse on the grounds that Rokugawa "is not properly combinable with Crumly '669 to teach or suggest a conductor trench being provided with a metalization". However, as clearly noted above and in the previous Office Action, Rokugawa is merely offered as evidence that it is known in the art to embed conductors. One of ordinary skill in the art would indeed look towards teachings to reduce the size of their device as size constraints are of great concern in the circuit board arts.

Moreover, Applicants proffer that "If Rokugawa was combined with Crumly, Crumley's (sic) raised features (14) and the copper traces (12), (21) would be substituted by Rokugawa's (sic) embedded conductor trenches. As a result, there are

no more raised features which allegedly serve for a positioning.” Applicants appear to be convinced that having embedded conductors disallows raised features. However, Examiner simply points to the process for forming the raised features disclosed in Crumly ‘887. A cursory inspection of figure 9 by the ordinarily skilled artisan would reveal this position to be false, as figure 9 distinctly shows the embedded conductors co-existing with the raised features.

Having address each of Applicants’ arguments, it is Examiner’s position that Applicants’ traversal of the instantly rejected claims on these grounds is deemed unsuccessful.

Allowable Subject Matter

Claim 15 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeremy C. Norris whose telephone number is 703-306-5737. The examiner can normally be reached on Mon.-Th., 9AM - 6:30 PM and alt. Fri. 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on 703-305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-0725 for regular communications and 703-308-0725 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



JCSN
July 27, 2003

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